

REMARKS

A. General Background

Claims 1-32 were pending.

In the Office Action, the pending claims were subjected to a four-way species election requirement.

In response various claims have been amended, new claims have been added for consideration, and a complete response has been made to the four-way species election requirement.

B. Amendments to the Application

1. Specification

Paragraphs No. [0003] originally filed has been amended with data about the United States patent that eventually issued from an identified related United States patent application pending at the time of the filing of the above-captioned application.

Accordingly, the amendment to Paragraph No. [0003] can be deduced from that paragraph as originally filed when combined with publicly available data of the United States Patent and Trademark Office.

Thus, the proposed amendment to Paragraph [0003] does not add new matter, and entry thereof is respectfully requested.

2. Claims

Pending independent Claims 1, 13, and 24, have been amended to clarify that, if the recited explosive device has been placed at a predetermined detonation site, and the explosive device fails to

detonate as intended, then “when said quantity of said microorganisms is mobilized, said microorganisms therein deactivate said explosive device by bioremediating said quantity of said explosive material *in situ* at said detonation site.”

In the specification as originally filed in the last pair of lines in Paragraph No. [0025] at page 8, it is stated that “methods are provided that remediate *in situ* an undetonated explosive [device] utilizing the biological activity of microorganisms.” In the fourth through seventh lines of Paragraph No. [0027] bridging pages 8-9 of the specification s originally filed, the terms “mobile” and “mobility” in relation to microorganisms and an explosive material are carefully defined. In the second and third lines from the end of Paragraph No. [0056] at page 14 of the specification s originally filed, the terms “bioremediate” and “bioremediation” are defined; thereafter it is stated that “[t]he present invention is thus one intended to bioremediate explosive materials.” Finally, as stated in the last three lines of Paragraph No. [0055] at page 14 of the specification s originally filed, if an “explosive charge [or device] fails to detonate, the explosive charge can then reliably be left undisturbed, and the microorganisms will digest or degrade the explosive material involved. Preferably, the explosive [device] will thereby be both disabled from detonation and detoxified.”

Accordingly, it is respectfully submitted that the amendment described above to independent Claims 1, 13, and 24 is supported in the specification as originally filed, and entry thereof is respectfully requested.

Independent Claim 1 has been broadened in paragraph (c) in two (2) respects.

First, by replacing the plural “aggregations” previously recited therein with the singular “aggregation,” it is intended, in combination with the use of the open claim format indicator “comprising” at the end of the preamble of Claim 1, to afford to independent Claim 1 a scope of protection that corresponds in effect to the recitation of “at least one aggregation.” All embodiments of the disclosed technology depicted in the figures as originally filed, include one aggregation or a plurality of aggregations. Accordingly, it is respectfully submitted that this first amendment to Claim 1 is fully supported in the specification as originally filed.

Secondly, in paragraph (c) of independent Claim 1 the previous recitation of a Markush group of shapes into which the recited aggregations are formed has been removed to new dependent Claim 45. Accordingly, it is respectfully submitted this second amendment to independent Claim 1 does not add new matter.¹

Accordingly, entry of independent Claim 1 as amended and presented herein is respectfully requested.

Dependent Claim 6 has been broadened by removing to new dependent Claim 56 the recitation of the step of embedding aggregations in the shell of Claim 4.

Accordingly, it is respectfully submitted that Claim 6 as amended and presented herein does not add new matter, and entry thereof is respectfully requested.²

¹ Correspondingly, new dependent Claim 45 does not add new matter, and entry thereof is respectfully requested.

² Correspondingly, new dependent Claim 56 does not add new matter, and entry thereof is respectfully requested.

Claim 14 has been amended to newly recite that the step of coupling recited in independent Claim 13 “affords access by said quantity of said microorganisms in said bioremediation apparatus to the interior of said shell [of Claim 14] and said quantity of said explosive material disposed therein.”

In the embodiment of the inventive technology illustrated in Figures 1-6, and particularly in the sequence of Figures 3, 5, and 6, the manner is illustrated by which the coupling of bioremediation apparatus 10 to explosive apparatus 60 affords access by microorganisms 30 and liquid 34 from bioremediation apparatus 10 to the interior of shell 62 of explosive apparatus 60 and, correspondingly, to explosive material 60 disposed in shell 62.

Accordingly, it is respectfully submitted that Claim 14 as amended and presented herein is supported in the specification as originally filed, and entry thereof is respectfully requested.

The balance of the amendments to previously pending Claims 1, 3-9, 11-17, 21, 22, and 24-32 implement consistent usage of terminology and correct typographical errors.

Accordingly, it is respectfully submitted that the balance of the amendments to those claims do not add new matter, and entry thereof is respectfully requested.

New dependent Claims 33, 57, and 69 newly recite that the shell of the base claim corresponding to each “has an open end.”

In, for example, the embodiment of the inventive technology depicted in Figures 1-6, shell 62 of explosive apparatus 60 includes an open end 64 in which bioremediation apparatus 10 is coupleable. Likewise, shell 62 depicted in the embodiment of Figures 7-8 includes an open end 64

into which bioremediation apparatus 100 becomes coupled, while shell 62 of explosive apparatus 110 illustrated in Figure 9 has an open end 64 into which bioremediation apparatus 140 is coupled. In the various depicted embodiments of the inventive technology illustrated in each of Figures 10-16, the open end of shell 206 of explosive apparatus 200 illustrated is closed by a cap 202. Nonetheless, in each of these embodiments, formed through the wall of shell 206 are a plurality of access openings 204 that loosely accommodate wire 76. Openings 204 affording access from the exterior of shell 206 to the interior thereof at a location that is in close proximity to the open end of shell 206 in which cap 202 is lodged.

Accordingly, it is respectfully submitted that new Claims 33, 57, and 69 are supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claims 34, 58, and 70 newly recite that “a hole is formed through” the shell of the base claim corresponding to each.

A hole of the type recited in new Claims 34, 58, and 70 is locatable in the specification as originally filed in the form of access openings 204 in the embodiments of the disclosed technology appearing in each of Figures 10-16. Wire access opening 78 illustrated and identified in Figures 2, 4, and 7-9 are also examples of holes of the type newly recited in new Claims 34, 58, and 70.

Accordingly, it is respectfully submitted that new Claims 34, 58, and 70 are supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claims 42 and 54 newly recite the step of “shaping a quantity of said microorganisms into an aggregation having the shape of a doughnut.”

The embodiment of the inventive technology illustrated in Figures 1-5, and the embodiment of the inventive technology illustrated in Figures 7 and 8 depict an aggregation of microorganisms 30 configured as a toroid, or doughnut. These aggregations of microorganisms are described in the specification as originally filed in the fifth and sixth lines of Paragraph No. [0078] on page 21 as being “positioned on a ring formed from starch and flour, bran, or other similar nutrient material.”

Accordingly, it is respectfully that new Claims 42 and 54 are supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claims 43 and 55 newly recite the step of “shaping said quantity of microorganisms into an aggregation having the shape of a block.”

In the embodiment of the inventive technology depicted in Figure 9, an aggregation of microorganisms 30 is illustrated and described in the second and third lines of Paragraph No. [0001] on page 32 as having been “added as a block to bioremediation apparatus 140.”

Accordingly, it is respectfully that new Claims 43 and 55 are supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claim 44 newly recites that “said quantity of said microorganisms is suspended in a liquid.”

In each of the embodiments of the inventive technology illustrated in Figures 1-9, once liquid 34 is released into contact with microorganisms 30, microorganisms 30 are mobilized and able to disperse throughout liquid 34 to become suspended therein. Such a condition is illustrated

specifically in Figures 6 and 8. In the specification in the final four (4) lines of Paragraph No. [0097] on page 27, an embodiment is described in which microorganisms are “in a sufficient quantity of liquid to be characterized as a suspension or dispersion. Such an embodiment accordingly utilizes but a single chamber and a single valve.” In the embodiment of the inventive technology depicted in Figure 12, a suspension 214 of microorganisms is illustrated within each of capsules 212 and is so described in the last pair of lines in Paragraph No. [0127] at page 38 of the specification as originally filed.

Accordingly, it is respectfully that new Claim 44 is supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claims 60 and 68 newly recite that microorganisms in aggregation form are as a result of the steps of forming and of positioning recited in the base claim corresponding to each, “located in proximity to the portion of said explosive device configured to receive a detonator for said explosive device.”

As disclosed in the first pair of lines of Paragraph No. [00131] at page 38, “microorganisms can be concentrated around detonator 74 to desensitize the explosive [device].” In the embodiment of the inventive technology depicted in Figure 14, microorganisms are disposed as granules 218 on top of explosive material 208 in close proximity to detonator 74. Thus, as stated in the last pair of lines in Paragraph No. [00136] on page 40 of the specification as originally filed, “as water passes through shell 206 the initial bioremediation activity of all the microorganisms is concentrated at the portion of explosive material around detonator 74.”

Accordingly, it is respectfully that new Claims 60 and 68 are supported in the specification as originally filed, and entry thereof is respectfully requested.

New Claim 62 is closely similar to independent Claim 1 as amended and presented above. Nonetheless, new independent Claim 62 is broader in scope than independent Claim 1 as amended and presented herein in that new Claim 62 recites the step of positioning “a quantity of microorganisms” within a functionally-specified proximity to a quantity of explosive material, but makes no reference to an aggregation or to aggregations of those microorganisms. Accordingly, new Claim 62 is intended to include within the scope thereof the embodiments of the inventive technology in which microorganisms are formed into one or into a plurality of aggregations, as well as those embodiments of the inventive technology in which, for example, by being suspended in a liquid, those microorganisms assume none of the shapes of aggregations otherwise depicted in the figures or recited among the claims.

Paragraph No. [00139] at page 41 of the specification as originally filed discloses the use of several forms of microorganisms that are not aggregated.

Yet another method of bioremediating explosives involves installing an explosive charge [or device] in a detonation site, such as a borehole, and then positioning microorganisms around the explosive charge by depositing microorganisms directly on the explosive charge and the detonation site. Similarly, a solution of microorganisms can be deposited at a detonation site. Then the explosive charge is placed in the suspension of microorganisms. Additionally, an explosive apparatus can be sprayed with or soaked in a suspension of microorganisms before being installed at a given detonation site, preferably while being exposed to a vacuum.

Accordingly, it is respectfully that new independent Claim 62 is supported in the specification as originally filed, and entry thereof is respectfully requested.

C. Species Election Requirements

1. Background

In the Office Action, pending Claims 1-32 were indicated to be directed to a plurality of distinct species of the invention relative to each of the following four (4) generic criteria:

Criteria A: the shape of the aggregation or aggregations, if any, into which microorganisms are formed;

Criteria B: the location of microorganisms relative to explosive material;

Criteria C: the barrier, if any, interposed between microorganisms and explosive material; and

Criteria D: the degree of mobility in microorganisms.

Accordingly, an election has been required for consideration on the merits under 35 U.S.C. § 121 of a single species of the invention that embodies an election relative to each of the generic criteria listed above.

New Claims 33-77 have been presented for consideration within that framework.

2. Response to the Species Election Request

In response, provisionally elected for prosecution on the merits is the species of the invention embodying in combination the following elections relative to each of the four (4) generic criteria listed above:

Criteria A (shape):	pellet
Criteria B (location):	embedded in explosive material
Criteria C (barrier):	no barriers
Criteria D (mobility):	freeze dried

Because these four (4) criteria identified are not mutually exclusive, and because recitations in some claims identified in the Office Action as typifying species within some criteria are in Markush format, the ramifications of the overall species election required are unusually complex.

The elected species within each generic criteria is identified and correlated on the following page to all pending and new claims that correspond thereto and to any pending or new claim that is generic to all species of that generic criteria.

	<u>Description</u>	<u>Corresponding Claims</u>
Criteria A (shape)	pellet	1-41, 45-53, 56-77
	Claims generic to Criteria A:	1-34, 36-41, 46-53, 56-63, 65-71
Criteria B (location)	embedded in explosive material	1-2, 4, 6, 8-12, 24-40, 45-52, 57-64, 66, 68-70, 72-77
	Claims generic to Criteria B:	1-2, 4, 6, 8-10, 12, 24-40, 45-52, 57, 58, 61-64, 66, 68-70, 73-77
Criteria C (barrier)	no barrier	1-15, 24-77
	Claims generic to Criteria C:	1-15, 24-77
Criteria D (vitality)	freeze dried	1-25, 27-43, 45-50, 52-72, 74-77
	Claims generic to Criteria D:	1-25, 28-43, 45-50, 53-72, 75-77

In light of the above, the following claims are respectfully submitted to be readable on the species of the invention embodying in combination each election relative to the four (4) generic criteria:

Claims 1-2, 4, 6, 8-12, 24, 25, 27-40, 45-50, 52, 57-64, 66, 68-70, 72, and 74-77.

In addition, the following claims are respectfully submitted to be generic to all species electable relative to the four (4) generic criteria:

Claims 1-2, 4, 6, 8-10, 12, 24, 25, 27-40, 46-50, 57, 58, 61-63, 66, 68-70, and 73-77.

D. Conclusion

In view of the response to the species election requirements set forth in Section C(2) above, it is assumed that from the claims presented for consideration, Claims 3, 5, 7, 13-23, 26, 41-44, 51, 53-56, 65, 67, 71, and 73 will be withdrawn temporarily from consideration.

Accordingly, it is submitted that an examination on the merits of Claims 1-2, 4, 6, 8-12, 24, 25, 27-40, 45-50, 52, 57-64, 66, 68-70, 72, and 74-77 is now in order, and such examination is hereby requested.

In the event that the Examiner finds any remaining impediment to a prompt allowance of this application which could be clarified by a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

DATED this 20th day of September, 2005.

Respectfully submitted,



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